

**REMARKS**

**Summary of the Office Action**

Drawings stand objected to because FIGs. 7 and 8 are not labeled as "Related Art".

Appropriate correction to the specification is required.

Claims 4-7 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

Claims 1, 4, 5, and 10-12 stand rejected 35 U.S.C. §103(a) as being unpatentable over *Christopher et al.*(U.S. Patent No. 6,058,013) in view of *Hunninghaus et al.*(U.S. Patent No. 5,708,566).

Claims 15 and 20-22 stand rejected under U.S.C. §102(a) as being anticipated by *Christopher et al.*

Claims 16-18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Christopher et al.*

Claim 19 stands rejected under 35 U.S.C. §103(a) as being unpatentable over *Christopher et al.* in view of *Miyagi et al.*(U.S. Patent No. 5,506,755).

**Summary of the Response to the Office Action**

Applicant has canceled claims 4 and 5 without prejudice or disclaimer, amended dependent claim 6 and independent claim 15 to more clearly define the invention. Applicant has also amended the specification to correct informalities. Accordingly, claims 1, 6, 7, 10-13, and 15-22 are currently pending.

In addition, Applicant submits concurrently herewith a Request for Approval of Drawing Changes.

**The Objection to the Drawings**

The drawings stand objected to because FIGs. 7 and 8 are not labeled as “Related Art.” In a Request for Drawing Change filed concurrently herewith, Applicant proposes to amend the drawings by labeling FIGs. 7 and 8 as “Related Art.” Accordingly, Applicant respectfully requests that the objection to the drawings be withdrawn.

**The Objection to the Specification**

The specification stands objected to for informalities. Applicant has amended the abstract of the disclosure and replaced pages 8-15 of the specification with the substitute pages 8-15 to address the Examiner’s concerns. Accordingly, Applicant respectfully requests the objection to the specification be withdrawn.

**The Rejection Under 35 U.S.C. §112, Second Paragraphs**

Claims 4-7 stand rejected under 35 U.S.C. §112, second paragraph. Applicant has canceled claims 4 and 5, and amended claim 6 in accordance with the Examiner’s comments. Thus, the rejections of claims 4 and 5 become moot, and Applicant respectfully submits that claim 6, as amended, fully complies with the requirements of 35 U.S.C. § 112, second paragraph. In addition, since claim 7 is dependent upon claim 6, as amended, claim 7 also fully complies with 35 U.S.C. § 112, second paragraph.

Accordingly, the Examiner’s consideration and withdrawal of the rejections of the claims 6 and 7 under 35 U.S.C. §112, second paragraph are respectfully requested.

**The Rejections under 35 U.S.C. 103(a)**

Claims 1, 4, 5 and 10-12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Christopher et al.* in view of *Hunninghaus et al.* The rejections are respectfully traversed for the following reasons.

With respect to independent claim 1, Applicant respectfully submits that *Christopher et al.* and *Hunninghaus et al.*, whether taken singly or combined, do not teach or suggest the claimed combination, including at least “said second heat radiating pattern has a larger area than that of said first heat radiating pattern.”

The Final Office Action alleges that although *Christopher et al.* fails to disclose that the second radiating pattern has a larger area than the first heat radiating pattern, *Hunninghaus et al.* discloses “the circuit board having heat-radiating pattern 44 on upper side and underside of the board and the underside radiating pattern having larger area than the upper side.” Applicant respectfully disagrees. As shown in Fig. 1 and lines 29-32 of column 3 of *Hunninghaus et al.*, the heat-radiating pattern (a plating layer) 44 overlies a portion of upper device surface 32 and lower mounting surface 38 of circuit substrate 12 in proximity to opening 46. Further, as shown in Fig. 1 and lines 42-47 of column 3 of *Hunninghaus et al.*, a solder mask 25 is formed on a lower mounting surface 38 of circuit substrate 12 and **is a discontinuous layer over mounting surface 38 and contains openings around the plating layer 44 of each thermal via** to permit the attachment of thermal vias 36 to thermal attachment pads 20. It is clear from Figs. 1 and 2 of *Hunninghaus et al.*, the under side radiating pattern of the plating layer 44 has the same area as the upper side radiating pattern of the plating layer 44. Therefore, *Hunninghaus et al.*, fails to

teach or suggest at least “said second heat radiating pattern has a larger area than that of said first heat radiating pattern” as recited in independent claim 1.

As discussed above, *Christopher et al.* fails to disclose the claimed combination, at least in which “said second heat radiating pattern has a larger area than that of said first heat radiating pattern.” Furthermore, *Hunninghaus et al.*, does not overcome the deficiencies of *Christopher et al.* Thus, even assuming that *Christopher et al.* and *Hunninghaus et al.* can be properly combined, which we disagree, the combination of these two references still does not teach or suggest that “said second heat radiating pattern has a larger area than that of said first heat radiating pattern” as recited in independent claim 1.

Therefore, Applicant respectfully asserts that the rejection of independent claim 1 under 103(a) should be withdrawn because *Christopher et al.* and *Hunninghaus et al.*, whether taken singly or combined, do not teach or suggest at least the above cited feature of independent claim 1, as amended. As pointed out in MPEP § 2143.03, “[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 409 F.2d 981, 180 USPQ 580 (CCPA 1974).” Furthermore, Applicant has canceled claims 4 and 5 without prejudice and disclaimer, and the rejections of claims 4 and 5 become moot. Applicant respectfully asserts that dependent claims 10-12 are allowable at least because of their dependence upon the independent claim 1 and the reasons set forth above.

#### **The Rejections under 35 U.S.C. 102(a)**

Claims 15, and 20-22 stand rejected under 35 U.S.C. §102(a) as being anticipated by *Christopher et al.* The rejection is respectfully traversed for at least the following reasons.

For the similar reasons as set forth above, with respect to independent claim 15, as amended, Applicant respectfully submits that *Christopher et al.* does not teach or suggest the claimed combination, including at least “said second heat radiating pattern has a larger area than that of said first heat radiating pattern.”

As pointed out in MPEP § 2131, “[t]o anticipate a claim, the reference must teach every element of the claim.” Thus, “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.

Verdegaal Bros. v. Union Oil Co. Of California, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987).”

Applicant respectfully asserts that the rejection under 35 U.S.C. §§ 102(a) should be withdrawn because *Christopher et al.* does not teach or suggest each feature of independent claims 15.

Furthermore, Applicant respectfully asserts that dependent claims 20-22, are allowable at least because of their dependence upon the independent claim 15 and the reasons set forth above.

#### **The Rejections under 35 U.S.C. 103(a)**

Claims 16-18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Christopher et al.* Claim 19 stands rejected under 35 U.S.C. §103(a) as being unpatentable over *Christopher et al.* in view of *Miyagi et al.* To the extent that these rejections are applied to claim 15 as amended, the rejections are respectfully traversed for the following reasons.

As discussed above, *Christopher et al.* fails to disclose the claimed combination, including at least the limitation of “said second heat radiating pattern has a larger area than that of said first heat radiating pattern.” Furthermore, *Miyagi et al.* does not overcome the deficiencies of *Christopher et al.* Thus, neither *Christopher et al.* nor *Miyagi et al.*, even assuming they can be properly combined (which we disagree), teaches or suggests that “said

second heat radiating pattern has a larger area than that of said first heat radiating pattern” as recited in amended independent claim 15.

Therefore, Applicant respectfully asserts that the rejection of dependent claims 16-19 under 103(a) should be withdrawn at least because of the dependence of these claims upon claim 15, and the reasons set forth above.

With no other rejection pending, Applicant respectfully submits that claims 1, 6, 7, 10-13 and 15-22 are allowable.

**Conclusion**

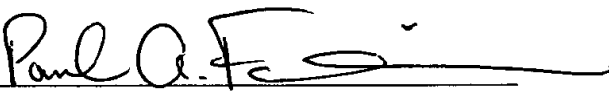
In view of the foregoing, Applicant respectfully requests entry of the amendments to place the application in clear condition for allowance or, in the alternative, in better form for appeal. Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Applicant's undersigned representative to expedite prosecution.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attachment is captioned "Version with markings to show changes made."

If there are any other fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-0310. If a fee is required for an extension of time under 37 C.R.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

Respectfully Submitted,

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Dated: June 10, 2002

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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE ABSTRACT:**

The abstract has been amended as follows.

In the present invention, a printed wiring board with an electronic component mounted on a circuit board in which the electronic component is provided with a heat radiating plate for conducting heat internally generated, ~~[is characterized in that]~~ **includes** ~~[the]~~ **a** heat radiating ~~[means]~~ **device** ~~[is]~~ mounted at a position corresponding to the electronic component on a rear surface of the circuit board.

**SPECIFICATION:**

The specification has been corrected by replacing pages 8-15 with the substitute pages 8-15.

**IN THE CLAIMS:**

Claims 4 and 5 have been canceled without prejudice and disclaimer.

Claims 6 and 15 have been amended as follows.

6. (Twice Amended) The printed wiring board according to ~~[any one of claims 1, 4 and 5]~~ **claim 1**, wherein said heat radiating means is made of metal, and is provided, on a rear side thereof, with ~~[an attaching plate]~~ **a plated layer** which is able to be brought into contact



with said circuit board [~~on a rear side thereof~~] and on a front side thereof, with a plurality of fins for radiating heat.

15. (Amended) A printed wiring board, comprising:

a circuit board;

an electronic component mounted on said circuit board and including a heat radiating plate for conducting heat internally generated;

a first heat radiating pattern for conducting heat formed at a position on a front surface of said circuit board corresponding to said electronic component, such that the heat radiating plate of said electronic component is connected to said first heat radiating pattern by soldering;

a second heat radiating pattern for conducting heat formed at a position on a rear surface of said circuit board corresponding to said electronic component;

a plated layer to which said second heat radiating pattern is soldered; and

heat radiating means mounted at a position corresponding to said electronic component on the rear surface of said circuit board, such that said heat radiating means is mounted on said circuit board via said plated layer, wherein

said second heat radiating pattern has a larger area than that of said first heat radiating pattern.